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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/627,781	07/28/2000	Hideki Nakahara	2000 1048A	3104
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		EXAMINER		
		TRAN, THIEN D		
		ART UNIT	PAPER NUMBER	
		2665		
DATE MAILED: 05/10/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/627,781

Applicant(s)

NAKAHARA ET AL.

Examiner

Thien D Tran

Art Unit

2665

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7, 10-14, 19, 25, 26 and 28 is/are rejected.
- 7) ☒ Claim(s) 8, 9, 15-18, 20-24 and 27 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-10, 11, 14, 19, 26, 28 are rejected under 35 U.S.C. 102(e) as being participated by Kleider et al (U.S Patent No. 6,487,252 B1), hereinafter Kleider.

Regarding claim 1, Kleider discloses a scheme for transmitting an OFDM signal from a transmission side to a reception side (col.1 lines 20-25), wherein

the OFDM signal comprises at least one data symbol consisting of a plurality of subcarriers having data therein, and at least one pilot symbol having a frequency component predetermined in analog signals, which have amplitude and phase (col.3 lines 5-20), the method comprising:

inserting on transmission side, said pilot symbol is inserted before or after one or more said data symbols, and transmitting the pilot symbol together with one or more said data symbols (col.3 lines 15-60), and

utilizing on reception side, the received pilot symbol for compensating for a frequency response variation of a transmission path resulted from at least one of

distortion in the transmission path, out-of-synchronization with passage of time, frequency drift, and residual phase error (col.7 lines 27-30).

Regarding claim 2, Kleider discloses that every subcarrier included in said pilot symbol is a pilot carrier predetermined in amplitude and phase (col.3 lines 5-20).

Regarding claim 3, Kleider discloses that pilot symbol is plurally and sequentially inserted before or after one or more said data symbols (figure 5).

Regarding claim 4, Kleider discloses that pilot symbol is periodically inserted before or after one or more said data symbols (col.7 lines 35-50).

Regarding claim 5, Kleider discloses that pilot symbol is non-periodically inserted before or after one or more said data symbols (figure 5).

Regarding claims 6, 7, Kleider discloses that pilot symbol is adaptively changed in frequency and number for insertion depending on a state of the transmission path (col.6 lines 10-30).

Regarding claim 8, Kleider discloses that the frequency response variation of said transmission path is compensated by using a compensation vector calculated, as a time series linear approximation, from a difference in frequency response between any two pilot symbols closest to each other (col.6 lines 20-35).

Regarding claim 9, Kleider discloses that the frequency response variation of said transmission path resulted from either one or both of said frequency drift and said residual phase error is compensated by using a value calculated, as a time series linear approximation, from a difference in phase between any two pilot symbols closest to each other (col.8 lines 10-50).

Regarding claim 10, Kleider discloses that the frequency response variation of transmission path is compensated by using an average value taken for a phase error among pilot carriers in said pilot symbol (col.8 lines 40-50).

Regarding claim 11, Kleider discloses that average value is calculated by weighing each amplitude value for the pilot carriers (col.11 lines 1-10).

Regarding claims 14, 26, Kleider discloses an OFDM signal receiver for receiving, from a transmission side, an OFDM signal comprising at least one data symbol consisting of a plurality of multicarriers (subcarriers), having data therein, and at least one pilot symbol including a plurality of subcarriers, at least one of the subcarriers having a frequency component predetermined in amplitude and phase, and being inserted before or after one or more said data symbols, col.1 lines 25-30 and col.3 lines 5-15, said OFDM signal receiver comprising:

- a fourier transformer for subjecting the received OFDM signal to fourier transform (col.4 lines 39-42);

- a transmission path frequency response compensator for detecting the pilot symbol from a signal provided by said fourier transformer, and, with respect to the signal, compensating for a frequency response variation for a transmission path (col.4 lines 45-50); and

- a demodulator 42, for receiving the signal compensated from the frequency response variation of the transmission path, and demodulating the signal to output demodulated data (figure 3).

Regarding claims 19, 28, Kleider discloses an OFDM signal receiver for receiving, from a transmission side, an OFDM signal comprising at least one data symbol consisting of a plurality of multicarriers (subcarriers) having data therein, and at least one pilot symbol including a plurality of subcarriers, at least one of the subcarriers having a frequency component predetermined in amplitude, and being inserted before and after one of more data symbols, col.1 lines 25-30 and col.3 lines 5-15, the OFDM signal receiver comprising:

a FFT (frequency-domain data symbol generator) for generating a frequency-domain data symbol from the received OFDM signal;

a phase compensator for detecting the pilot symbol from a signal provided by the frequency-domain data symbol generator, and compensating the signal for at least one of frequency drift and residual phase error, col.6 lines 40-50; and

a demodulator for receiving the signal compensated for the at least one of the frequency drift and the residual phase error, and demodulating the signal to output demodulated data, col.8 lines 25-50.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 12, 13, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kleider et al (U.S Patent No. 6,487,252 B1), hereinafter Kleider.

Regarding claim 12, Kleider discloses an OFDM signal transmitter for transmitting an OFDM signal towards a reception side, comprising:

a data symbol generator for generating an OFDM data symbol after inputting data for transmission;

a pilot symbol generator for generating an OFDM pilot symbol (col.3 lines 35-50);

and

a pilot symbol is inserted before or after one or more said data symbols (figure 5).

Kleider does not disclose a symbol selector for switching between data signals and pilot signals. However, it would have been obvious to one having ordinary skill in the art to have the selector for switching and allowing pilot signal inserted into a signaling stream to achieve the same performance of Kleider as it is shown in figure 5. Therefore, implementing the selector feature in the transmission system of Kleider helps achieving synchronization of the OFDM communication system.

Regarding claim 13, Kleider discloses that data symbol generator comprises:

a frequency-domain data symbol generator for generating a frequency-domain data symbol after inputting data for transmission (col.2 lines 30-40); and

an inverse Fourier transformer for subjecting a signal provided by said frequency-domain data symbol generator to inverse Fourier transform (col.4 lines 50-52), and said pilot symbol generator comprises:

a frequency-domain pilot symbol generator for generating a frequency-domain pilot symbol; and

an inverse Fourier transformer for subjecting a signal provided by said frequency-domain pilot symbol generator to inverse Fourier transform (col.4 lines 5-50).

Regarding claim 25, Kleider discloses an OFDM signal transmitter, wherein a data symbol generator comprises:

a frequency-domain data symbol generator for generating a frequency-domain data symbol after inputting the data for transmission (note\* signal from wideband is in frequency domain before inputting to IFFT for converting to time domain (col.2 lines 35-40) ; and

an IFFT (time-domain data symbol converter) for converting the frequency-domain data symbol into a time-domain data symbol, and a pilot symbol generator comprises (col.2 lines 50-55):

a frequency-domain pilot symbol generator for generating a frequency-domain pilot symbol (col.2 lines 50-60); and

a time-domain pilot symbol converter for converting the frequency-domain pilot symbol into a time-domain pilot symbol (col.2 lines 50-60).

***Allowable Subject Matter***

5. Claims 8, 9, 15-18, 20-24, 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.



6. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Thien Tran whose telephone number is (703) 308-4388. The examiner can normally be reached on Monday-Friday from 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu, can be reached on (703) 308-6602. Any inquiry of a general nature of relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3900.

Thien Tran



STEVEN H. D NGUYEN  
PRIMARY EXAMINER